

## **Forestry herbicide effects on zebrafish early development.**

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Herbicides used to control invasive or noxious plants on public lands are often applied in the upper reaches of watersheds where Pacific salmon spawn. Because there are few data regarding the sublethal effects of common forestry herbicides on developing fish, the use of herbicides in or near spawning habitat is of concern for salmonids. To overcome the logistical difficulties associated with laboratory studies of salmonid embryos, we used the zebrafish model system to conduct rapid and sensitive phenotypic screens for potential developmental defects caused by exposure to six herbicides commonly used in the Pacific Northwest. For each herbicide (picloram, clopyralid, imazapic, glyphosate, imazapyr, and triclopyr), newly fertilized zebrafish eggs were placed into one of eight nominal concentrations ranging from 0.03 to 10mg/L. Fish were exposed until 5 days post-fertilization (dpf) using static exposures renewed every 24 hours. Phenotypic screens included daily examination of anatomy with light microscopy to assess structural defects, and touch response in hatched larvae to look for abnormalities in the integration or expression of sensory and motor systems. No developmental abnormalities were observed at environmentally relevant exposure concentrations. These data do not rule out other sublethal effects of forestry herbicides not addressed by the screen.